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(54) **METHOD AND APPARATUS TO IMPROVE VEHICLE SITUATIONAL AWARENESS AT INTERSECTIONS**

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(58) **Field of Classification Search** 340/917, 340/906, 933, 932, 905, 907, 936; 701/117, 701/119

See application file for complete search history.

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(57) **ABSTRACT**

The present invention includes a number of embodiments for improving vehicle situational awareness at intersections. A first embodiment may comprise a lens fitted at the top of the windshield or outside the vehicle, for refracting the light to the driver, so the driver may more easily see signals, signage and other features of an intersection, as well as other traffic. A second embodiment of the invention is used as an aid to prompt the driver that a light has changed. In a third embodiment, the light change sensor may be combined with other vehicle status information. As the car comes to a stop, the route guidance system may determine if the vehicle is at or in the vicinity of an intersection. Depending on the route guidance database, the system may also know whether or not there are traffic lights at the intersection. Using the vehicle's on board forward-looking radar sensor, the system may then determine if it is first in line at the intersection. In a fourth embodiment the system may be part of a portable after-market routing device. In a fifth embodiment the system, either portable or fixed, may be used to detect changes in the intensity of the brake lights of the vehicle ahead.

14 Claims, 13 Drawing Sheets